

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of : Kishio SHIBATO et al.
Serial No. : 10/784,792
Filed : February 24, 2004
Art Unit : 1712
Examiner : PENG, KUO LIANG

Assistant Commissioner for Patents
Washington, D.C. 202331

DECLARATION UNDER 37 CFR 1.132

I, Yoshinori NAKANE, declare as follows:

1. I am a coinventor of the above-identified patent application.

2. I received a Paper Doctor's Degree (Engineering), from Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, on November of 1999.

3. I have worked for the NOF Corporation of Tokyo, Japan, since April of 1990, and I have transferred to BASF NOF Coatings Co. Ltd. of Yokohama, Japan since October of 2000, and I have transferred to BASF Coatings Japan Ltd. of Yokohama, Japan since April of 2005, and I have researched and developed many paint in the companies.

4. I carried out the following experiments to compare the

presently claimed invention.

Comparative Example 4

Comparative Example 4 was conducted in the same manner as Example 12 of the above-identified patent application Serial No. 10/784,792, except that a mixture of METHYL SILICATE 51 and an acrylic resin prepared by copolymerizing the monomers with the polymerization initiator of composition shown in Table 5, without METHYL SILICATE 51, in the manner of Preparation Example 9, was used instead of modified resin F'-2.

Comparative Example 4" was thus conducted as follows.

(1) Preparation of acrylic resin

Into a four-necked flask equipped with a thermometer, a reflux condenser, a stirrer and dropping funnel, 60 parts by weight of xylene was charged and heated under stirring until the temperature reached to 140 °C . To the xylene kept at 140 °C , a mixture of 18 parts by weight of glycidyl methacrylate, 18 parts by weight of n-butyl acrylate, 25 parts by weight of methyl methacrylate, 4 parts by weight of 2-hydroxyethyl methacrylate, 20 parts by weight of 2-methoxyethyl acrylate and 2 parts by weight of t-butylperoxy-2-ethylhexanoate was added by dropping at constant velocity for 2 hours from the dropping funnel.

After the dropping, the mixture was kept to the temperature of 140 °C for 1 hour and the reaction temperature was decreased to 100 °C . And then, the solution of 0.2 parts by weight of t-butylperoxy-2-ethylhexanoate and 4.5 parts by weight of xylene was added to the mixture. The mixture was kept at 100 °C for 2 hours. The reaction was finished and a solution of acrylic

resin D-2 was obtained. A nonvolatile matter of the solution of acrylic resin D-2 was 56.0 percent by weight.

In the following Table 10, the monomers and the polymerization initiator for the modified resin F'-2 and the acrylic resin D-2 are shown.

Table 10

| modified resin F' | | F' - 2 | |
|--|--------------------------------------|--------|------|
| acrylic resin D | | | D-2 |
| Initial charge (part by weight) | xylene | 60 | 60 |
| | METHYL SILICATE 51 | 15 | — |
| Dropping material (part by weight) | glycidyl methacrylate | 18 | 18 |
| | n - butyl acrylate | 18 | 18 |
| | methyl methacrylate | 25 | 25 |
| | 2 - hydrocylethyl methacrylate | 4 | 4 |
| | 2 - methoxyethyl acrylate | 20 | 20 |
| | t - butylperoxy - 2 - ethylhexanoate | 2 | 2 |
| Adding catalyst (part by weight) | t - butylperoxy - 2 - ethylhexanoate | 0.2 | 0.2 |
| | xylene | 4.5 | 4.5 |
| Nonvolatile matter (percent by weight) | | 60.2 | 56.0 |

(2) Preparation of clear coating composition

The clear coating composition of Comparative Example 4 was prepared by mixing the raw materials of composition shown in Table 11. The clear coating composition of Example 12 of the above-identified patent application Serial No. 10/784,792 is also shown in Table 11.

The clear coating composition of Example 12 is the same as that shown in Table 6 of the above-identified patent application Serial No. 10/784,792.

Table 11

| | Example 12 | Comparative Example 4 |
|---|------------|--------------------------|
| Formulation ratio (part by weight) | | |
| modified resin F' - 2 | 100 | |
| acrylic resin D-2 | | 91 |
| solution of curing agent, B - 1 | 27 | 27 |
| silicate, C - 2 | 2 | 2 |
| METHYL SILICATE 51 | - | 9 |
| others | | |
| hydrolysis catalyst | 2 | 2 |
| curing catalyst | 2 | 2 |
| solution of ultraviolet light absorbent | 7 | 7 |
| solution of light stabilizer | 7 | 7 |
| solution of surface controlling agent | 1.5 | 1.5 |
| SOLVESSO 100 | 3 | 3 |
| Total | 151.5 | 151.5 |

(3) Preparation of test piece and evaluation of paint film properties

Preparation of test piece of Comparative Example 4 was conducted in the same manner as Example 12 of the above-identified patent application Serial No. 10/784,792

Thus, cationic electrodeposition coat AQUA No. 4200 (trade name, a product of NOF Corporation (presently BASF COATINGS JAPAN LTD.)) was applied by electrodeposition to a soft steal plate treated with zinc phosphate in an amount to form a film having dried thickness of 20 μ m and the coated plate was baked at 175 °C for 25 minutes. Intermediate coat HS-H300 (trade name, a product of NOF Corporation (presently BASF COATINGS JAPAN LTD.)) was applied to the coated plate by air spraying in an amount to form a film having dried thickness of 30 μ m and the coated plate was baked at 140 °C for 30 minutes. And further, solvent type black base coating composition, BELCOAT No. 6000 (trade name, a product

of NOF Corporation(presently BASF COATINGS JAPAN LTD.)) was applied to intermediate coat by air spraying in an amount to form a film having dried thickness of 15 μ m. After the coated plate was set at 20 °C for 3 minutes, the coating composition prepared in above mentioned (2) was diluted with thinner (SOLVESSO 100/butyl acetate=9/1 of weight ratio) to a viscosity required for spraying (25 seconds at 20 °C by Ford cup No.4) and was applied on the plate by airspraying in wet-on-wet coating method in an amount to form a film having dried thickness of 40 μ m and the plate was baked at 140 °C for 30 minutes to obtain a test piece.

Evaluation of paint film properties of Comparative Example 4 was conducted in the same manner as Example 12 of the above-identified patent application Serial No. 10/784,792

The results are shown in Table 12, together with that of Example 12.

Table 12

| | Example 12 | Comparative Example 4 |
|--|--------------|------------------------|
| Base coat | Solvent type | Solvent type |
| Paint film structure | 2C1B | 2C1B |
| Paint properties | | |
| Finish appearance | ○ | ○ |
| Contact angle of water | 30° | 46° |
| Stain resistance in outdoor exposure (Δ L value) | - 1.4 | - 3.0 |
| Water resistance | Non abnormal | Generation of blushing |
| Acid resistance | Non abnormal | Non abnormal |

The above test data show unexpected results of the presently claimed invention in comparison with Comparative Example 4.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001, of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: November 26, 2007

Yoshinori Nakane

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